

THE NAVAL PROVING GROUND

They had a place where civilians could watch them fire the guns occasionally. I remember how the ground would shake; it was a terrific concussion. Your eyes sort of vibrated and your vision was blurry. After the shot, you could see a poof of dirt in the desert.

—Kay Lambson—

As tensions built toward world war in the late 1930s, the U.S. Navy hired contractors to build naval bases on the Atlantic and Pacific coasts, Hawaii, Guam, and at five Pacific atolls named Johnston, Palmyra, Samoa, Midway, and Wake. The bases were to implement a war plan named Rainbow Five. In the event of war with Japan, the five westerly bases would form a kind of defensive curtain protecting the Navy's major fleet base in Hawaii. Offensively, they were to be take-off points for bombers to hit Japanese targets in the Marshall Islands and Kwajalein.

The war started before the bases were ready. In December of 1941, Japan crippled the fleet in Pearl Harbor, attacked Midway, and captured Wake and Guam,

preventing the United States from carrying out Rainbow Five. The Navy quickly expanded its West Coast bases and also

looked inland for support facilities. Gun factories, for example, needed to be secure from potential enemy raids by sea.¹

The Sixth Supplemental National Defense Appropriation Act of 1942 placed two support facilities in Idaho. One was the Farragut Naval Training Center, a training base for sailors at the southern end of Lake Pend Oreille. The other was the Naval Ordnance Plant at Pocatello, established on April 1, 1942, under the command of the Navy's Bureau of Ordnance.²

was situated on 211 acres about three miles north of Pocatello. The Navy chose the site because Pocatello was home to one of the largest Union Pacific Railroad terminals in the country and on the route of a transcontinental highway. Lying east of the coastal mountain ranges, it was reasonably secure, and the plant could take delivery of steel, chemicals, ordnance, and battleship guns shipped from the West Coast.

The guns came from such fighting ships as *USS Missouri* and *USS Wisconsin* whose revolving armored turrets, stud-

ded with sixteen-inch guns, the

Navy's most powerful,

helped win the Pacific war. Repeated firing

of the guns eroded the bore, wore out the rifling, and compromised the accuracy of the gun. The

Pocatello plant removed the dis-

torted inner sleeves of the gun barrels, relined them with fresh metal, rifled the new linings, and then tested them for



Built by the Morrison-Knudsen Company of Idaho, one of the Navy's major contractors, the ordnance plant



The battleship USS Missouri wears out the linings in its guns.

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accuracy. In addition, the plant warehoused ordnance and manufactured new guns and gun mounts—large and small—for service on Pacific fleet battleships.³

As an accessory to the plant, the Navy needed a firing range on flat terrain and about thirty miles long to proof fire the guns. It first considered a site near Taber, a tiny settlement about forty miles northwest of Pocatello. But the ground there was uneven, and lava rock was too close to the surface for ease of construction. The Navy looked further north and found an ideal site: flat, remote, and unpopulated. What few acres were in private hands had to be condemned, but most of the land was in the public domain.⁴

On the southern edge of the site, a Union Pacific branch line passed by on

its way from Pocatello northwest to the towns of Arco and Mackay. The place was sixty-five miles from Pocatello, and it would be easy to extend a spur line and build a siding. The Navy withdrew about 271 square miles from the public domain and built the Naval Proving Ground (NPG). Its acreage cut a jagged-edged swath into the desert roughly nine miles wide and thirty-six miles long. From the firing point at the south end, the guns had an unobstructed range toward the northeast.

The Navy intended to house some of its employees, both military and civilian, at the proving ground with their families. The facility was divided into two parts: the residential area and the proof area. As at Pocatello, the Morrison-Knudsen Company built everything at the site, subcontracting some of the work to the J.A. Terteling

Company, another Idaho construction firm. The place was dedicated and ready for business on August 2, 1943.⁵

The eighty-five-acre proof area was north of the residential area and fenced; anyone entering had to pass a guard-house. It contained a battery of gun emplacements, a concussion wall and control tower, and magazines for smokeless powder, fuzes, and charges. An office building, railroad tackage, oil storage tanks, electrical substation, and other facilities supported the operations. A locomotive hauled the guns and other loads from place to place around the proof area. Most of the buildings were made of reinforced concrete to withstand the vibration and shock from the guns and potential munitions explosions.

The concussion wall, designed to absorb blast and protect those who fired the guns, was a particularly formidable piece of architecture. Standing between the gun emplacements and the residential area to the south, it was 315 feet long, 8 feet thick, and 15 1/2 feet high. Its rebar was doubled and placed in a close eight-inch grid. Those in the control tower behind the wall could peer out of narrow window slits at the emplacements, each painted with a letter to make up the slogan "SAFETY FIRST."⁶



INEEL 2974

Residential area of the Naval Proving Ground as it looked in July 1951, view to southwest. Older section is at right near water tower.

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The railroad brought the guns and other material from Pocatello to a siding dominated by a 250-ton gantry crane. A gun ready to be proofed was positioned on one of the ten emplacements and loaded with a charge, most likely prepared by a “WOW,” a civilian Woman Ordnance Worker. Down the range, to the east and west of the centerline, were rows of concrete monuments, marked and placed at regular distances. To prepare for a test, spotters drove down dirt roads named Centerline, West Monument, and East Monument. From observation posts, they communicated with operators in the control tower and used the monuments to triangulate the location of impact. In this way, they evaluated and recorded the performance of the gun.⁷

Less than half a mile from the concussion wall was the residential area, divided into two sections by the railroad spur coming in from the Union Pacific branch. The officers and several civilian families lived on the west side of the tracks in brick houses with white shutters. The Navy built for permanence, planting the grounds with trees and shrubs. The northern-most dwelling, the one with a matching garage, was reserved for the commanding officer. The southern-most was a barracks and mess for up to fourteen enlisted marines. Beyond the barracks were a kennel for the marines’ patrol dogs and a well-supplied commissary, which the civilians called “the store.”⁸

After the war, the Navy built more houses, wanting to alleviate winter travel problems for employees who commuted between the site and Arco. It built a loop road on the east side of the



INEEL 3629

railroad tracks and arranged nineteen white-painted wood-frame houses around it, back yards facing to the spacious interior of the loop. Most of the houses, if not all, had basements, and each had generous yard space to grow gardens. The Navy finished installing the lawns and sidewalks in October of 1946.⁹

The main landmark for “the Base” was an elevated water tank perched on a wooden tower in the residential area. Officially, the railroad siding and village were named “Scoville” after Commander John A. Scoville, the Officer in Charge of Construction of the Pocatello plant and the proving ground. The Navy named the main roads Lincoln Boulevard, Farragut Avenue, and Portland Avenue, a legacy that remained—along with the name Scoville—after the Navy left the site.¹⁰

Proof area in October 1951. Gantry crane at lower left. Gun emplacements in foreground. Buildings in center are behind concussion wall. Storage area at upper right.

In this setting, the wartime business of firing lethal weapons and detonating huge explosive charges co-existed with a small—and unique—Idaho village. The Navy shipped first-run movies to the residents twice a week. These were shown in the locomotive shed next to the spur line. On movie nights, the locomotive was parked outside, displaced by the movie projector and rows of benches. The versatile building also served as a fire station and garage.¹¹

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Children were an integral part of the community. The marines made skating rinks for them in the winter. Students filled up a gun-metal-gray bus and went to school at Arco seventeen miles away, sometimes accompanied by a marine when certain boys got out of hand. In typical military fashion, the bus stopped one day each year in front of the marine barracks, where no child could escape the dreaded "tick shot," a booster to prevent Rocky Mountain spotted fever.¹²

Trouble was easy for children to find, what with forbidden piles of railroad ties lying about and Navy floats and buoys awaiting repair on the dry desert ground. One year, one of the lieutenants tried to grow freshwater clams in a pond made from a gravel pit, but was thwarted when some of the children discovered them and opened



Courtesy of Orville and Margaret Larsen

Margaret Larsen, the NPG's first Woman Ordnance Worker, and her son John pose in the shadow of the water tower in 1949.

every one, amazed at the beautiful purple luster inside. Another temptation was the water tower. At least one pair of enterprising young girls sneaked away from home one night, thinking it would be a good idea to climb to the top. They tripped an alarm, and the marines came after the intruders with flashlights and guns, shouting "Halt!" High in the air and giddy from excitement, the girls couldn't manage the descent, so the marines had to fetch them down.¹³

Characteristic of its civilian/military blend, the settlement found ways to deal with remoteness and isolation. One of the civilian families kept a small herd of dairy cows a mile or so northwest of the village. The father and his sons went each day to collect the milk, brought it home to the basement of their house, separated and pasteurized it, and delivered it to the other residents in a milk truck. In summers, the men organized baseball teams and played teams from Arco, Mackay, and other towns. When not otherwise working, women entertained each other at sewing circles. During one winter, an unusually heavy snow storm closed the roads to the base, isolating it for nearly a month. The residents offered refuge to travelers stranded on the road and sheltered them in their homes for the duration. The Navy dropped food bundles from airplanes into snowbanks. All were relieved when the roads opened before a woman who was pregnant had to leave for the hospital.¹⁴



Courtesy of Orville and Margaret Larsen

The extraordinary winter of 1948. The Navy dropped food and other supplies when snow blocked roads to Arco and Blackfoot.

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Meanwhile, the Bureau of Ordnance found many ways to exploit its expanse of desert. The proofing of guns commenced on November 20, 1943, with the shooting of an anti-aircraft gun high into the air. Proofing continued after the war ended in 1945; the Naval Proving Ground eventually fired 1,650 minor and major caliber gun barrels. For 1944 alone, the commander ordered over 15,000 projectiles, to be used for gun tests and target practice.¹⁵

Bomb groups and fighter squadrons training at the Pocatello Army Air Base regularly blasted two areas of the proving ground as they practiced high-altitude bombing techniques. Residents grew accustomed to the drone—day and night—of B-24 Liberator bombers and B-17 Flying Fortresses as they dropped hundred-pound sand-filled practice bombs with black powder spotting charges, trying to hit wooden pyramid targets.¹⁶

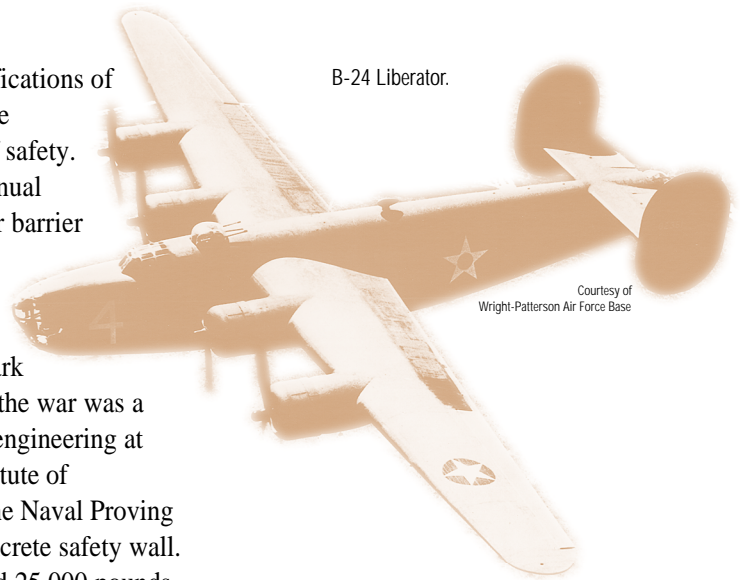
The Navy permitted the U.S. Army to use part of the grounds for detonation research. At ordnance centers elsewhere, the Army managed loading plants, where charges of TNT and other explosives were packed into their shells and cartridges. Freshly loaded projectiles were stored within safety cells separated by concrete barrier walls. Should the contents of one cell ignite or explode accidentally, the wall was supposed to prevent the contents of the adjacent cell from detonating. The Army Safety and Security Division had reason to believe in 1944 that the quantities of explosives accumulating in the safety cells of its loading plants,

while within the specifications of the safety manual, were exceeding the limits of safety. Possibly the safety manual needed to be revised or barrier standards improved.

To test this premise, Lieutenant Colonel Clark Robinson, who before the war was a professor of chemical engineering at the Massachusetts Institute of Technology, came to the Naval Proving Ground. He built a concrete safety wall. On one side, he stacked 25,000 pounds of TNT against the wall to represent fresh-loaded bombs. On the other side, he placed 5,000 more pounds of TNT. In the first test, setting off the 25,000 pounds resulted in the detonation of the small pile as expected, and the barrier wall turned to dust and very small rubble. The test confirmed that the barrier wall could not isolate the impact of a 25,000-pound explosion. He built more tests and experimented with air gaps—leaving several feet of air between the pile of TNT and the concrete wall—and different amounts of TNT. It was all to find a safer way to store bombs.

Typical of scientific experiments, the test engineers predicted how each test would perform and then compared predictions to the actual results. With each main test, Robinson used the opportunity to do side experiments. One day, he set out small token charges at varying distances from a large TNT charge, expecting the closest ones to go off by sympathetic detonation. On the day of the test, the blast went off as planned, but some of the

B-24 Liberator.



Courtesy of
Wright-Patterson Air Force Base



Courtesy of Pat Gibson

Pat Gibson, daughter of a civilian ordnance worker, and her horse, Ginger. Marine barracks in distance at right.

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NAVAL ORDNANCE PLANT
FOCATILLA, ARIZO

To: *Ensign Address Commanding Officer and Ensign J. W. M. (1944)*

MAR 1 1944

To: Bureau of Ordnance
Navy Department
Washington 25, D. C.

Subject: Proof of AA Guns at High Elevations.

1. In accordance with current directives that anti-aircraft guns should be proved at an extreme elevation, the 3"/50 and 5"/38 AA guns have been fired at an elevation of 84°30' at near proof pressures. It is believed that this same elevation is used at the Naval Proving Ground, Dahlgren.
2. There have been several instances recently where proof projectiles from the 3"/50 guns fired at 84°30' have landed to the rear of the proof area at the Naval Proving Ground, Arco, Idaho. This is considered highly dangerous not only to the personnel engaged in the firing, but to the civilians in the community some half mile to the southern end of the emplacement.
3. The Commanding Officer has, therefore, directed that the anti-aircraft guns fired at extreme elevation at the Naval Proving Ground, Arco, shall be fired at an elevation of 80° instead of 84°30'. It is believed that this meets all the requirements of the Bureau in directing that one round shall be fired at extreme elevation, and it is believed that it will obviate the possibility of projectiles landing to the rear of the gun.

[Signature]
Captain U.S.N.
Commanding Officer

WEB:ovo

cc: WFO, Dahlgren
WFO, Arco

Interim Ordnance Cleanup Program
Record Search Report 121-ICP-02, Rev. 2

Combining gun proofing and civilian habitat sometimes presented special hazards.

results were unexpected. The blast effect of the detonation was lower than he predicted.

This is presumably because of our altitude (4,950 feet) and the consequent lower density of air over that at sea level where most of the blast effects have been noted. Incidentally, this is in line with our observation obtained when firing guns at the Proving Ground... Not only were no windows broken, but the windows at the Proving Ground approximately 6 miles from the

scene of the explosion were not even rattled, and at the very small settlement [Midway] some 12 miles from the scene...they barely heard the noise.

Another surprise was that none of the small token charges went off during the blast. Robinson concluded that the formula he had been using to determine safe air-gap distances, while correct at sea level, was probably not correct for a higher altitude. He concluded that it might be safe to permit closer spacing of magazines at high altitudes with the same degree of safety. He and the Navy commanding officer immediately asked for more explosives to do more air-gap tests.¹⁷

And so it went. The Army and Navy went on to do more barrier-wall tests, some using slabs of 3/8th-inch steel plate as part of the wall. They did boxcar tests, wanting to identify the blast characteristics of projectiles stored longitudinally on a boxcar. Results helped them advise how far from depot buildings a loaded boxcar should be parked to be safe. Later they sent up illuminating star shells and white phosphorus projectiles to find out how well they would perform as a smoke screen.¹⁸

Perhaps the most spectacular tests were the ones that blew up igloo-type magazines loaded with explosives. On August 29, 1945, at 9:36 a.m. Mountain Time, the Navy exploded 250,000 pounds of TNT. After the atomic bomb itself, this blast was said at the time to be the next largest deliberate detonation ever set. Seismologists, geologists, meteorologists, and ordnance depot representatives from all over the coun-

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try converged at the test site to observe and take measurements. The public found perches on East and Middle buttes and along the highway. At Boise, two hundred miles away, a small group clustered atop Table Rock Mesa east of the city to watch and listen. None were disappointed. The blast produced a purple-gray cloud a mile wide and more than a mile high. It left a crater fifteen feet deep. The group on Table Rock Mesa heard the report fifteen minutes after the blast. None of the other igloos constructed as close as two hundred feet away ignited, but the windows blew out of a test barracks erected a half mile away.¹⁹

Other experiments tested the performance of different kinds of projectiles, fuzes, and explosive loads. The engineers and chemists tested smokeless powder and amitol charges, and tested for fragmentation of projectiles. They sought ways to store large quantities of projectiles—or redesign the projectiles—to prevent all of them from detonating at once in case of an accident aboard a ship or other place where they had to be stored “in intimate contact” with each other. Test by test, they refined their understanding of how explosives might safely be stored and transported.²⁰

Although technicians tried to collect unexploded ordnance after each test, they often failed to find it all. Occasionally a projectile was “initiated by desert heat,” as someone wrote in 1949. “It is possible that some [unexploded projectiles] may be lying loose in the area.” To the cairns and dry irrigation canals already in the landscape, the years of explosives experimentation added huge craters, piles of shattered concrete and twisted metal, and bomb shells.²¹

After the American victory over Japan, naval vessels were quickly decommissioned. Coastal bases started shipping to Pocatello one trainload after another of guns, armor plate, gun housings, and “miscellaneous” materials for storage. Much of this material—nets, floats, anchors, mooring rings, buoys—went to the Naval Proving Ground to await sandblasting and repainting. Experiments continued into 1947 and 1948, but at a slower pace than before and no longer in association with the Pocatello gun plant, which curtailed its operations in late 1949.²²

Some of the later tests were classified. Project Elsie is thought to have tested the performance of sixteen-inch shells made with depleted uranium. The purpose of Project Marsh is still generally unknown. In 1947, the Naval Proving Ground was designated a depot for stockpiling surplus manganese for the United States Treasury—starting with nearly twenty-five tons. In 1948 there were tests of influence fuzes and countermeasures for guided missiles.²³



U.S. Army Corps of Engineers, Rock Island District

One of ten craters in Mass Detonation Area, where an igloo-type magazine containing up to 500,000 pounds of TNT was detonated in October 1946.



INEEL Cultural Resources 4A-18

The Atomic Energy Commission adapted one of the Navy's ordnance storage bunkers as a laboratory for calibrating dosimetry equipment.



U.S. Army Corps of Engineers, Rock Island District

This 500-pound semi-armor-piercing bomb was found near the Experimental Dairy Farm during the ordnance cleanup of the 1990s.

Huge Powder Blast Rocked Wide Area

from Arco Advertiser, August 31, 1945

A huge chocolate colored cloud of dust, shaped like a mushroom, followed by two muffled thuds, was what a large group of navy and army officials, scientists, photographers and others experienced Wednesday morning when a cache of 250,000 pounds of TNT were exploded on the desert near the gunnery range. For several days all of Eastern Idaho excitedly awaited the blast, as this was the largest collection of powder ever set off by man.

On the desert area about 10 miles east of the gunnery range the navy had constructed four igloos. Two were of a design approved by the army and two were of a navy design. They were in proximity of about 500 yards. Each was built of reinforced concrete and stored 250 thousand pounds of powder. The one exploded was the army type, and the purpose of the experiment was to determine the strength of the igloos and how far the earth would be shaken. Seismographs had been placed at various places in the surrounding area, and a series of blast meters, like spokes in a wheel, extended from the igloo area to a distance of approximately one-half mile.

Within close proximity of the blasted igloo were installed concrete shelter proofs for military photographers, and about a quarter of a mile distant was the dug-out where the men who set off the charge were housed. The dug-out was of reinforced concrete, and sandbags protected the entrance-way.

Promptly at 9:30 the signal to touch off the explosion was radioed to the control dug-out and the first sight was a huge, billowing cloud of dust which resembled an enormous mushroom. In approximately 15 seconds the explosion was heard—two muffled reports. Capt. Walter Brown, commandant, was certain that the second blast heard was an echo.



Courtesy of Orville and Margaret Larsen

The huge cloud of dust seemed to hover over the spot for about ten minutes and gradually moved westward toward the Arco community, as the air currents destroyed the symmetry of the cloud and it began to resemble a huge dust storm.



U.S. Army Corps of Engineers, Rock Island District

An inspection of the spot where the igloo stood showed a pit approximately 15 feet deep which was strewn with large chunks of reinforced concrete, steel and wire reinforcing material. Most of the steel surrounding the bombs of TNT seemed to have been completely destroyed, although small fragments were found a half mile distant.



U.S. Army Corps of Engineers, Rock Island District

Above. Cloud from one of the mass detonation experiments. Middle. Largest of the craters in Mass Detonation Area was later enlarged and graded by IDO for use as a demolition range. Photo circa 1995. Below. Ruptured and empty cans of smokeless powder partially fill a crater. Photo circa 1995.

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Although another war would bring large Navy guns back to the old Proving Ground in the late 1960s, the Navy would no longer own the facility. By that time, the original firing range was dotted with laboratories and other buildings, so guns could no longer be fired to the north and had to be pointed south. A new federal agency had acquired the Navy's desert property and was using this remote region of Idaho for an altogether different kind of scientific "proofing."



INEEL 70-59

From 1968 to 1970, during the Vietnam War, the Navy test-fired sixteen-inch guns from the battleship USS New Jersey. The firing point, named the Naval Ordnance Test Facility, was south of the Experimental Breeder Reactor-I complex, and the target was the northern flank of Big Southern Butte. Sixteen-inch guns were the only World War II-era naval weapons used during the Vietnam War. The Navy moved the old gantry crane (photo left) from its original location and used it again to unload guns brought from Pocatello by rail. The purpose in reworking the guns was to extend their range for use in clearing 200-yard-diameter landing zones in the heavily canopied jungles of Vietnam.